

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

Name: Staum Dam

County: Beadle

Legal Description: T113N- R59W- Sec14

Location from nearest town: 3 miles south, 1 mile east of Carpenter, SD

Dates of present survey: June 15, 2010

Date last surveyed: June 15, 2008

Managed Species	Other Species
Largemouth Bass	Black Bullhead
Bluegill	Hybrid Sunfish

PHYSICAL DATA

Surface Area: 46 acres

Watershed: 9,000 acres

Maximum depth: 16 feet

Mean depth: 6.5

Volume: Unknown

Shoreline length: 2.8 miles

Contour map available: Yes

Date mapped: 1970

Lake elevation observed during the survey: Full

Introduction

Staum Dam was constructed by the Works Progress Administration (WPA) around 1934. It was likely named for Edward Staum, who was the owner of the land the dam was constructed on. Staum, and other landowners, also provided public access easements for land underneath and surrounding the lake.

Ownership of Lake and Adjacent Lakeshore Property

Staum Dam is an artificial impoundment owned and managed by the South Dakota Department of Game, Fish, and Parks (GFP). Nearly the entire lake lies within a Game Production Area owned and managed by GFP.

Fishing Access

Staum Dam has a single lane, concrete boat ramp located on the southeast corner of the lake. The entire shoreline is publicly owned and accessible to shore fishing.

Field Observations of Water Quality and Aquatic Vegetation

Submergent vegetation, mostly sago pondweed (*Potamogeton pectinatus*) and Chara (*Chara spp.*), was very dense in shallow water areas.

BIOLOGICAL DATA

Winterkill:

Staum Dam experienced a moderate winterkill in 2007-2008 that reduced the abundance of largemouth bass and bluegills. Black bullheads survived the winterkill and increased in abundance relative to other species.

Methods:

The fish population in Staum Dam was sampled by electrofishing at night for 80 minutes on June 2, 2010. Nearly the entire shoreline of the lake was sampled.

Results and Discussion:

Electrofishing Catch

Black bullhead (60.0%), largemouth bass (33.3%), and bluegill (6.7%) were sampled during this year's survey (Table 1).

Table 1. Total catch from 1.3 hours of nighttime electrofishing at Staum Dam, Beadle County, June 2, 2010.

Species	Number	%	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	39	37.5	29.3	<u>+15.7</u>	14.8	36	6	86
Largemouth Bass	39	37.5	29.3	<u>+23.5</u>	48.8	83	71	104
Bluegill	26	25.0	19.5	<u>+8.5</u>	26.3	24	0	105

* Three years (2004, 2006, 2008)

Table 2. Catch per hour by length category for various fish species captured by electrofishing in Staum Dam June 2, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	2.3	27.0	17.3	8.2	1.5	29.3	<u>+15.7</u>
Largemouth Bass	11.3	18.0	3.0	2.3	12.7	29.3	<u>+23.5</u>
Bluegill	0.8	18.7	14.2	4.5	--	19.5	<u>+8.5</u>

Length categories can be found in Appendix A.

¹ See Appendix A for definitions of CPUE, PSD, and mean Wr.

Largemouth Bass

Management objective: Maintain a largemouth bass fishery with an electrofishing CPUE of at least 20.

Largemouth bass abundance has increased since the 2007-08 winterkill and now exceeds the management objective (Table 3). Eight year classes were sampled indicating consistent natural reproduction. Growth is well above the statewide, regional and small impoundment means with bass reaching 381 mm (15 in) by age-4 (Table 4).

Table 3. Largemouth bass electrofishing CPUE, PSD, RSD-P and mean Wr for Staum Dam, Beadle County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE				83.3		51.8		11.3		29.3
PSD				43		77		100		83
RSD-P				27		52		46		71
Mean Wr				102		104		100		104

Table 4. Average back-calculated lengths, in mm, for each age class of largemouth bass from Staum Dam, Beadle County, June 2, 2010.

		Back-calculation Age								
Year Class	Age	N	1	2	3	4	5	6	7	8
2009	1	16	168							
2008	2	3	159	262						
2007	3	1	126	244	337					
2006	4	2	152	269	363	404				
2005	5	5	127	262	340	388	423			
2004	6	1	119	206	324	390	427	438		
2003	7	6	88	183	276	348	382	419	437	
2002	8	2	145	301	345	362	395	424	442	449
All Classes		36	136	247	331	379	407	427	439	449
Statewide Mean			96	182	250	305	342			
Region III Mean			111	212	287	347	383			
SLI* Mean			99	183	246	299	332			

*Small Lakes and Impoundments (<150 acres)

Bluegill

Management objective: Maintain a bluegill fishery with an electrofishing CPUE of at least 50 and RSD-18 of at least 20.

The bluegill population is currently rebuilding after the winterkill (Table 5). The absence of fish over age-2 suggests that the adult bluegill population was most affected by the winterkill (Table 6). Sampled bluegills ranged in length from 70 to 150 mm (2.8 - 5.9 in), and growth is faster than regional, statewide and small lakes and impoundments means (Table 6).

Table 5. Bluegill electrofishing CPUE, PSD, RSD-18, RSD-P and mean Wr for Staum Dam, Beadle County, 2001-2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE				10.5		66.0		2.3		19.5
PSD				36		7		--		24
RSD-18				0		5		--		0
RSD-P				0		0		--		0
Mean Wr				128		132		--		105

Table 6. Average back-calculated lengths (mm) for each age class of bluegills in Staum Dam, Beadle County, 2010.

Year Class	Age	N	Back-calculation Age							
			1	2	3	4	5	6	7	8
2009	1	1	80							
2008	2	24	50	128						
All Classes		25	65	128						
Statewide Mean			55	103	141	166				
Region III Mean			60	116	157	180				
SLI* Mean			53	101	138	163				

*Small Lakes and Impoundments (<150 acres)

Black Bullhead

Management objective: Maintain a black bullhead population with an electrofishing CPUE of less than 100 per hour.

Bullhead abundance increased slightly and size decreased since 2008 (PSD=36) (Table 7 and Figure 2). The bullhead population was apparently unaffected by the winterkill. Mean length and RSD-P decreased as larger, older fish were replaced by smaller fish (Table 4 and Figure 2). Recruitment of young bullheads may have been enhanced by low bass abundance following the winterkill.

Table 7. Black bullhead electrofishing CPUE, PSD, RSD-P and mean Wr for Staum Dam, Beadle County, 2001-2010.

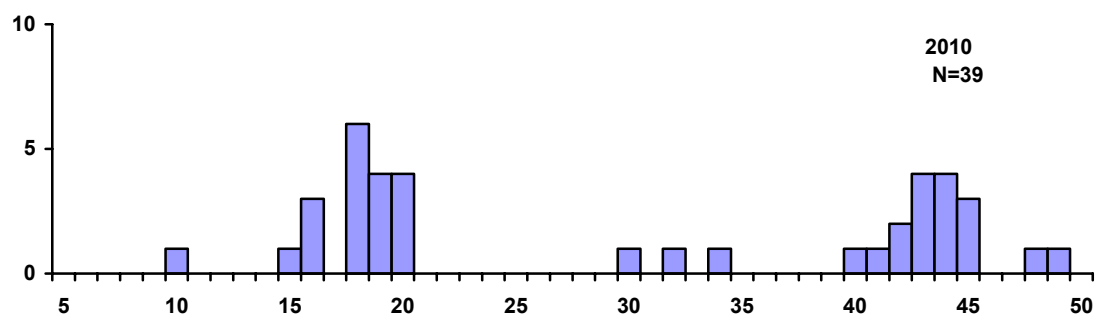
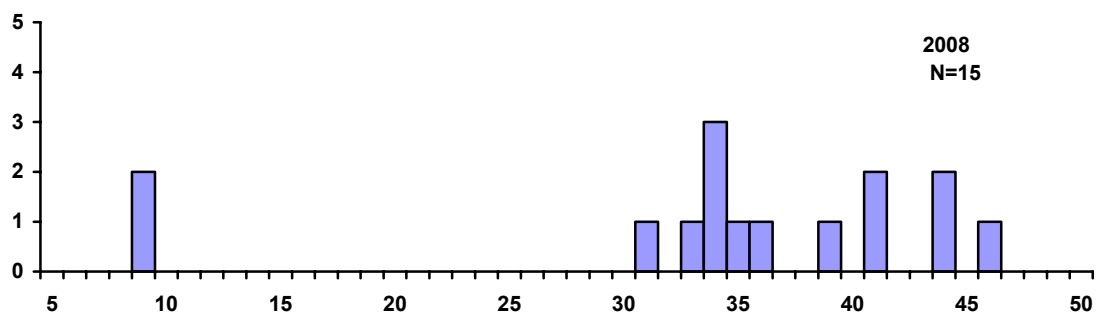
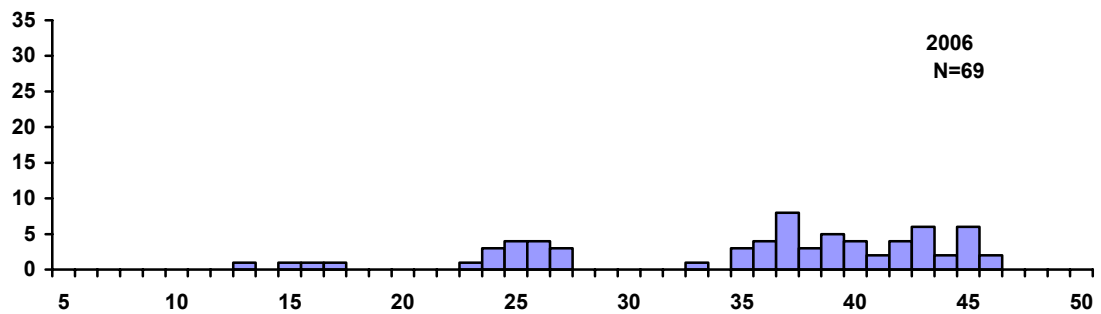
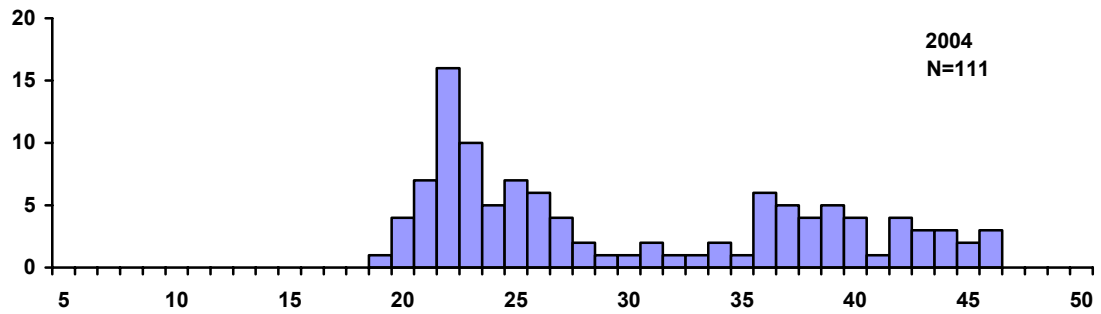
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE				14.3		9.8		20.3		29.3
PSD				100		85		92		36
RSD-P				84		85		8		6
Mean Wr				124		109		107		86
Ave. TL				327		336		260		201

MANAGEMENT RECOMMENDATIONS

1. Conduct another electrofishing survey in 2012 to monitor the fishery.
2. Consider stocking fingerling or adult largemouth bass and bluegill if natural reproduction fails to maintain population abundance at objective levels.

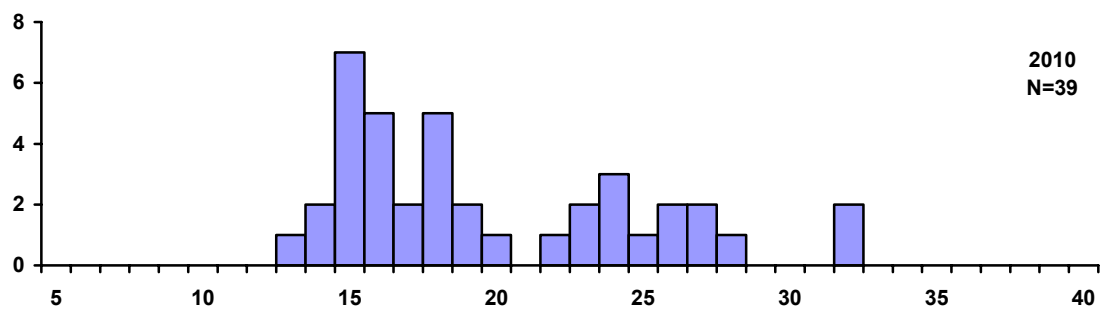
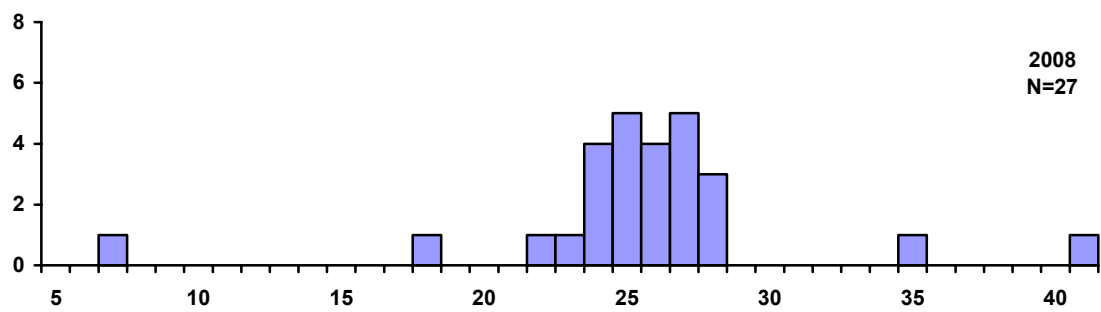
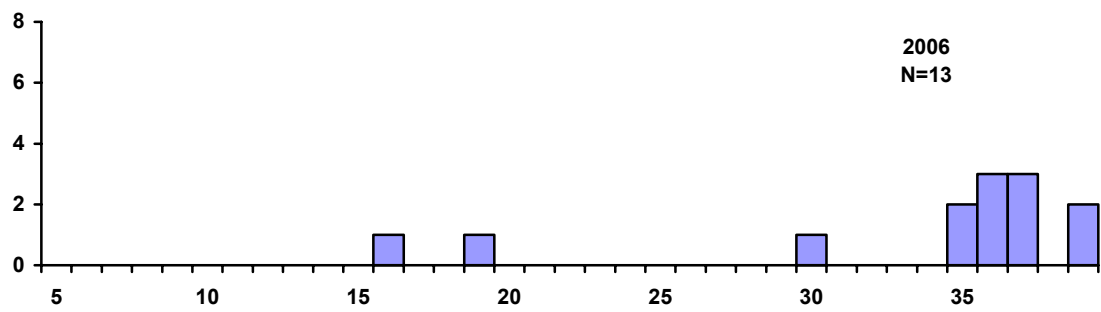
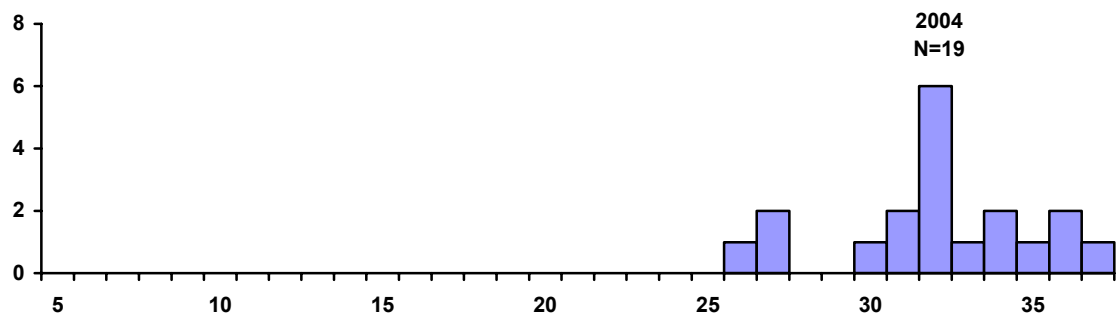
Table 8. Stocking record for Staum Dam, Beadle County, 1990-2010.

Year	Number	Species	Size
1992	6,000	Largemouth Bass	Med. Fingerling
1998	28	Largemouth Bass	Adult
	6,900	Largemouth Bass	Fingerling
1999	465	Largemouth Bass	Adult
	4,600	Largemouth Bass	Fingerling
2000	320	Bluegill	Fingerling
	380	Bluegill	Adult
2002	52,480	Bluegill	Fingerling
	860	Bluegill	Adult



Length-Centimeters

Figure 1. Length frequency histograms for largemouth bass sampled by electrofishing in Staum Dam, Beadle County, 2004, 2006, 2008 and 2010.



Length-Centimeters

Figure 2. Length frequency histograms for black bullheads sampled by electrofishing in Staum Dam, Beadle County, 2004, 2006, 2008, and 2010.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters. (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.